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ABSTRACT

A program has been initiated in New York City to ensure that children will learn basic mathematical skills, The Promotional Gates Program ends social promotion (the practice of promoting students regardless of achievement). Students in grades 4-7 who test below grade level in mathematics or reading are placed in special remedial classes until they meet standards; they are then promoted. The program sends a message to students that mastery of mathematical skills is vital to their success in school and in life. It also guarantees they graduate with a basic knowledge of mathematics. However, the program will only make a dent in improving mathematics/science education since students cannot be expected to learn when qualified teachers are not teaching. The lure of lucrative private sector jobs for those talented in mathematics/science has debilitated teaching staffs throughout the country. In New York City, the shortage has resulted in the use of less-qualified teachers. Approaches to the problem fall into two major categories: those involving incentives encouraging qualified people to enter the teaching profession or stay, and those that retain teachers in other subject areas to teach in mathematics or science. In addition, a program to foster school/business relationships has been recently launched. (JN)

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STRATEGIES FOR OBTAINING QUALIFIED MATHEMATICS AND SCIENCE TEACHERS FOR THE SCHOOLS

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AMERICAN PHYSICAL SOCIETY, JANUARY 24-27, 1983

NEW YORK HILTON

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First let me thank the American Physical Society for inviting me to be part of such a distinguished panel.

I know I do not have to describe to you in detail the crisis we all face as a result of the shortage of qualified mathematics and science teachers. If the schools cannot cultivate the interest of children in science and math and prepare them for advanced work in these subjects, they will not be able to provide the nation with the scientific and mathematical leaders it needs. If the schools allow children to graduate without learning technical skills, they will be unable to provide the business world with a qualified workforce. Most importantly, schools that allow children who have not mastered at least basic mathematical and scientific precepts to graduate have failed the children themselves. If we allow children to have this gap in their education, we deprive them of the important chance of understanding the world in which they live. Besides, we deprive them of a fair chance of competing in the working world.

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As you all know, our American economy no longer has a strong manufacturing base. Technology has replaced much of the need for manual labor. People, I am happy to say, are not yet obsolete, however. Trained personnel are needed to create new technology, to repair technology, and to operate it. An unskilled person will no longer find great opportunities in American industry. He will most likely join the ranks of the unemployed, already too large.

Because this problem concerns education, it would be easy to blame it on the schools. I could tell you that it's not our fault, that it's the fault of X, Y, or Z, but that would solve nothing. We should not blame each other. Instead, the schools must cooperate with business, government, and professional associations to solve the problem.

The schools themselves can take some action to address the crisis. Although part of the problem of lack of skills lies in the shortage of teachers, part lies in the shortage of standards. For too long we have allowed students to progress from grade to grade and graduate without insuring that they have met requirements. How can we expect graduates to possess the technical skills the working world demands when we do not set goals and expect them to be met?

In New York City, we have instituted a program to insure that children will learn basic mathematical skills. The program, called the Promotional Gates Program, ends social promotion -- the practice of promoting students regardless of achievement. Students in the fourth and seventh grades who test below their grade level in math or reading are placed in special remedial classes until they meet standards. They are then promoted. This program sends a message to the children that mastery of mathematical skills is vital to their success in school and in life. It also guarantees that they graduate with a basic knowledge of mathematics.

This program will make only a small dent in improving math and science education. We cannot expect students to learn when qualified teachers are not teaching. The lure of lucrative private sector jobs for those talented in math and science has debilitated teaching staffs throughout the country. Those who have skills in demand are using their skills in the private sector rather than teaching these skills to children who can then be qualified for private sector jobs themselves. We cannot blame those who choose private business employment over teaching careers. School systems cannot offer salaries comparable to private sector compensation. Potential teachers reasonably choose alternative careers.

The loss to the schools, however, is enormous. In New York City the shortage of qualified science teachers is forcing us to use less qualified instructors. On the Junior High School level alone, there were 400 people teaching science who did not have licenses in science. As a stopgap measure this might suffice, but the use of unqualified teachers is not a viable long-term solution to the problems of the shortage.

Approaches to attacking this problem fall into two major categories -- those that involve incentives encouraging qualified people to enter the teaching profession or stay and those that retrain teachers in other subject areas to teach in math or science.

One incentive approach involves paying teachers of math and science higher salaries than those paid to other teachers. As my fellow panelist Mr. Shanker can tell you better than I, this proposal causes problems. Yes, it may lure qualified science and math people back into the teaching profession, but how will the lower paid English and social studies teachers feel? Eventually such a policy could, of course, curb incentives for college graduates to teach other subject areas, and shortages could occur elsewhere.

Such a cycle could be broken if we could pay all teachers salaries comparable to those offered by the private sector. Until the nation decides that education is as important as I think it is and provides schools with the funds they deserve, districts cannot possibly match corporate salaries.

Less unrealistic would be government support of efforts to recruit and retain teachers of science and mathematics. One possibility often mentioned is a replica of the National Health Corps. Students who plan to teach science or mathematics would be granted government loans that would not require repayment if the students actually taught for a specified number of years. Another option would be for math and science teachers to be granted tax breaks, giving them larger net incomes and incentives to remain in the profession.

For either of these alternatives to occur, we must all make the government aware of the crisis the shortage is creating. We must pay careful attention to the various legislative proposals dealing with this problem and make our opinions about them heard. Without government support, all other efforts will fail.

We can, of course, call upon business to provide some incentives for teachers to remain teachers or for employees to teach part-time. Although such efforts may be contrary to industry's short term interests, they do serve long-term goals. The corporate sector must begin to plan ahead. As fewer and fewer high school graduates appear who have the skills considered assets in our technical world, the more business will see the need for qualified teachers who can train the future workforce.

The private sector has begun to see its need for good schools in New York City. Our new Join-a-School Program, officially launched this month, matches high schools to corporations that volunteer to create a personal relationship with them. We hope the relationships will involve more than the donation of money and equipment, such as computers, although such gifts are indeed welcome. We hope the corporations will encourage their employees to donate their time and expertise to classroom experiences, especially in mathematics and science classes.

Programs such as this or ones in which companies provide after school or summer employment for math and science teachers to supplement their income are valuable, but they alone will not solve the teacher shortage. The number of companies willing to donate time and money to the public schools is increasing, but will never be large enough. The private sector is not in the business of solving the nation's social problems, even when the problems carry economic consequences.

Perhaps the preferable solution to the shortage would join business, government, and schools themselves in a retraining effort. With public funds to subsidize cou s , private sector facilities or personnel, and school inservice time, professionals who already possess good teaching skills can be trained to transfer these skills from social studies to science or English to mathematics. Such a program would be less costly than subsidized college tuitions for potential teachers, less politically and philosophically dubious than differentiated pay scales, and less dependent on uncertain private sector support than business voluntarism schemes. The program would show results relatively quickly and would cause no shortages in any subject area.